State of the Climate across Western and North Central Nebraska

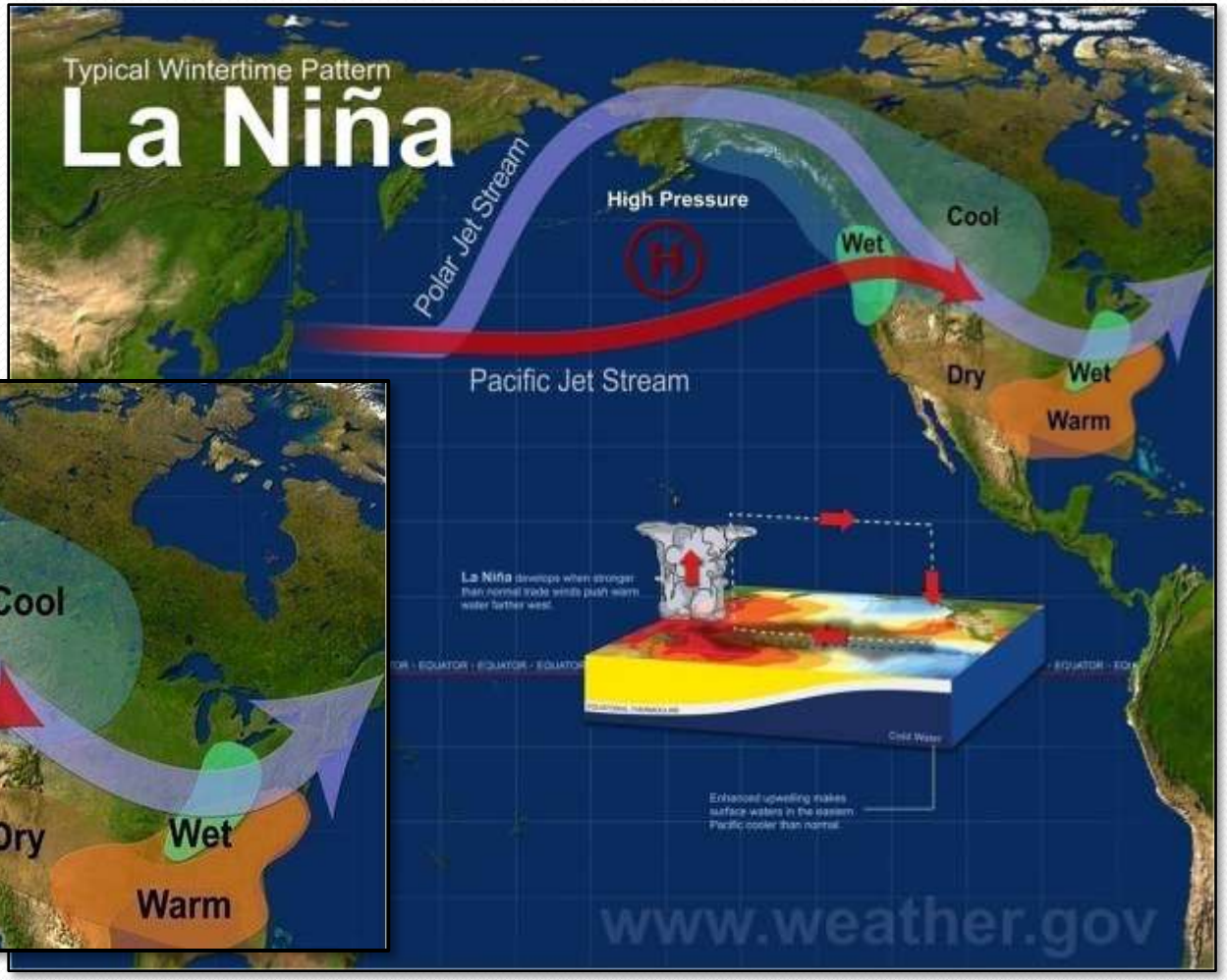
By Matt Masek

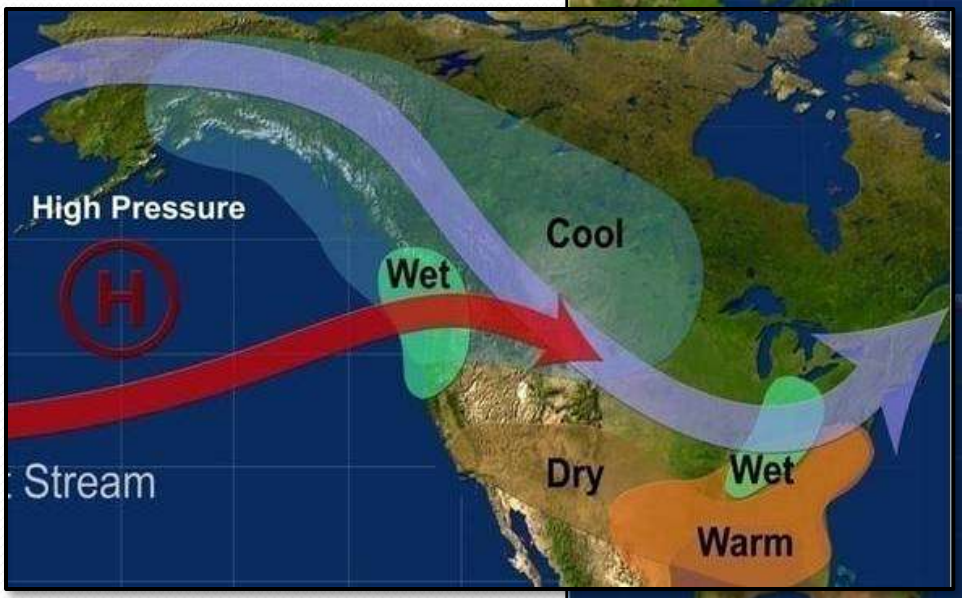
March 23, 2011

Weakening La Niña

La Niña - Typical Wintertime Pattern

For western & north central Nebraska, closer proximity to cool temperatures and drier conditions.





What was 2010-2011 Winter?

- Temperatures were below normal
- Precipitation (rain/snow) was above normal
- Why - moderate to strong La Niña
  - Polar Jet Stream stronger and further south

2010-2011 Winter
North Platte, NE

Facts for the 3 month period of December, January and February (including the last 5 years)

	Ave High	Ave Low	Ave Temp	Precip	Snowfall	Days Lows < 0	Days Highs > 32	Days Highs 50+	Days Highs 60+
Average	38.7	13.4	26.1	1.37	13.7	12.6	61.5	22.6	6.4
Max	47.2	22.9	34.2	4.23	34.3	42	86	46	23
Year	1991-92	1930-31	1991-92	1913-14	2006-07	1978-79	1991-92	2005-06	1980-81
Min	23.7	1.0	12.4	0.14	1.2	0	25	0	0
Year	1978-79	1978-79	1978-79	1980-81	1980-81	1930-31 1991-92	1978-79	1978-79	10 times latest 2009-10
2006-07	35.1	10.3	22.7	3.98	34.3	20	48	11	5
2007-08	38.3	10.5	24.4	0.97	12.9	17	61	15	5
2008-09	41.7	11.5	26.6	1.53	18.2	11	67	25	11
2009-10	33.5	11.5	22.5	1.66	26.1	13	47	8	0
2010-11	37.8	10.4	24.1	2.17	29.5	16	59	20	6

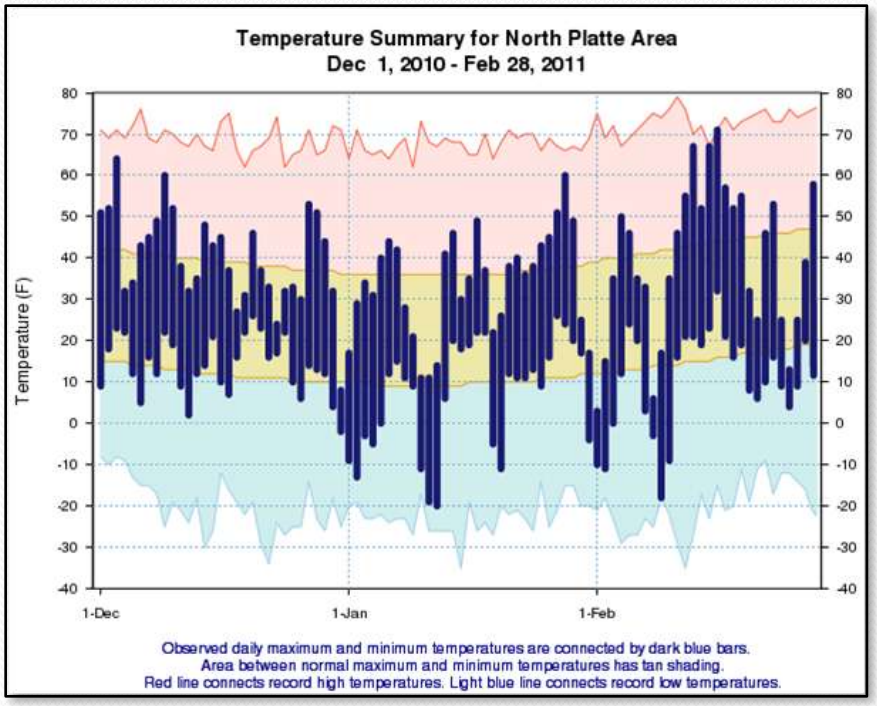
Temperature and Precipitation Records (1874-1875 to current)
Snowfall Records (1892-1893 to current)
Leap years have 91 days / Non-leap years have 90 days

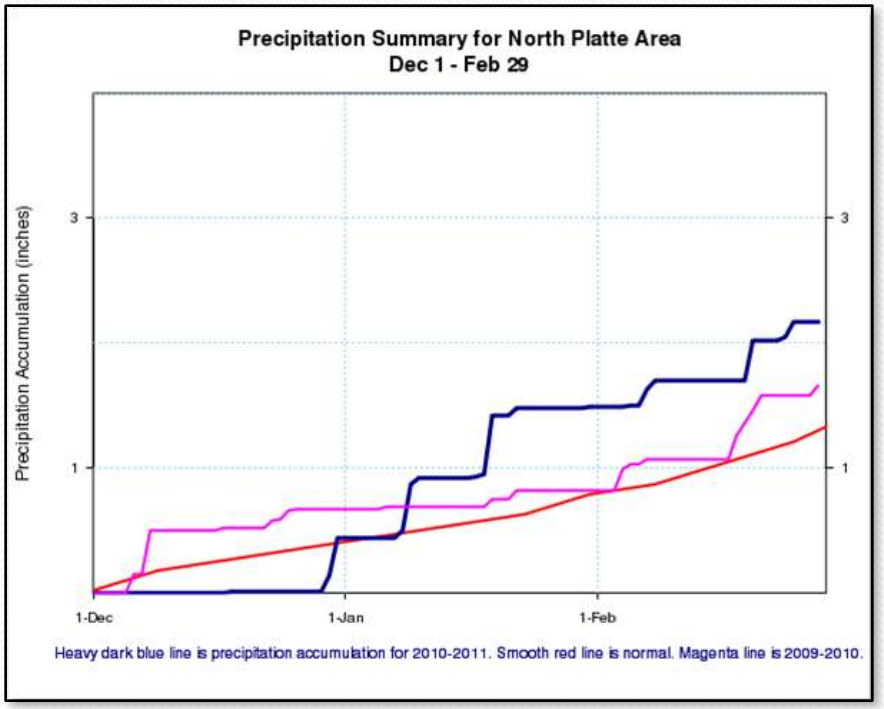
2010-2011 Winter
North Platte, NE

Top 10 Finishes for the 2010-2011 Winter (Dec, Jan, Feb)	
Rank	Snowiest
1	34.3 (2006-07)
2	33.2 (1977-78)
3	33.0 (1948-49)
4	31.2 (1992-93)
5	29.5 (2010-11)
6	27.7 (1902-03)
7	27.6 (1954-55)
8	26.1 (2009-10)
9	25.9 (1968-69)
10	24.1 (1957-58)

3 of the top 10 snowiest winters (Dec, Jan, Feb) have occurred in the last 5 years

2010-2011 Winter
North Platte, NE





Temperature Summary for North Platte
Dec 1, 2010 to Feb 28, 2011
Smooth tan line is normal
Red and blue lines are records

Precipitation Summary for North Platte
Dec 1, 2010 to Feb 28, 2011 (dark blue)
Dec 1 2009 to Feb 28, 2010 (magenta)
Smooth red line is normal

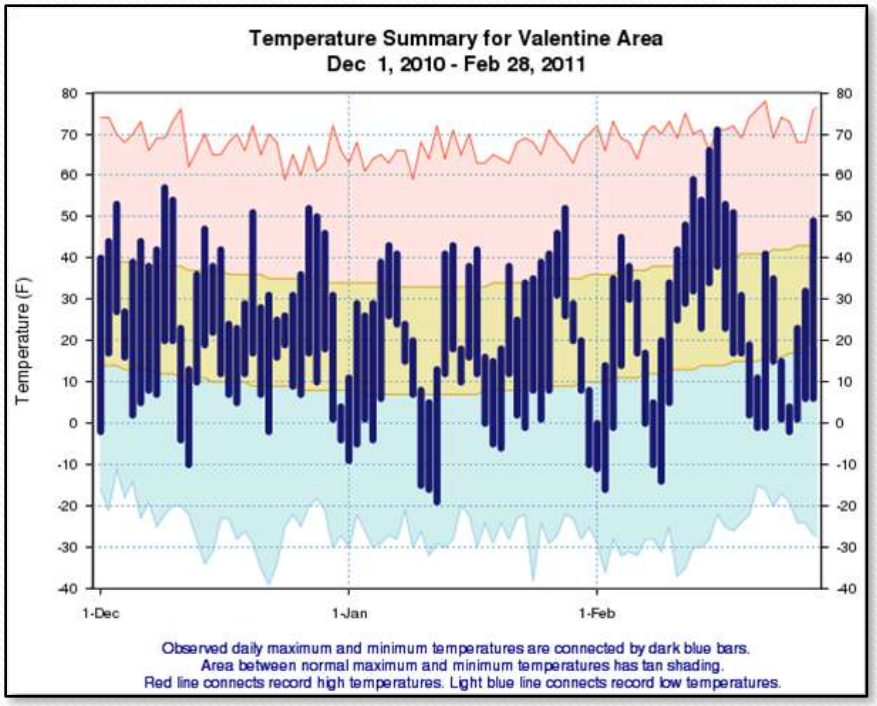
2010-2011 Winter Valentine, NE

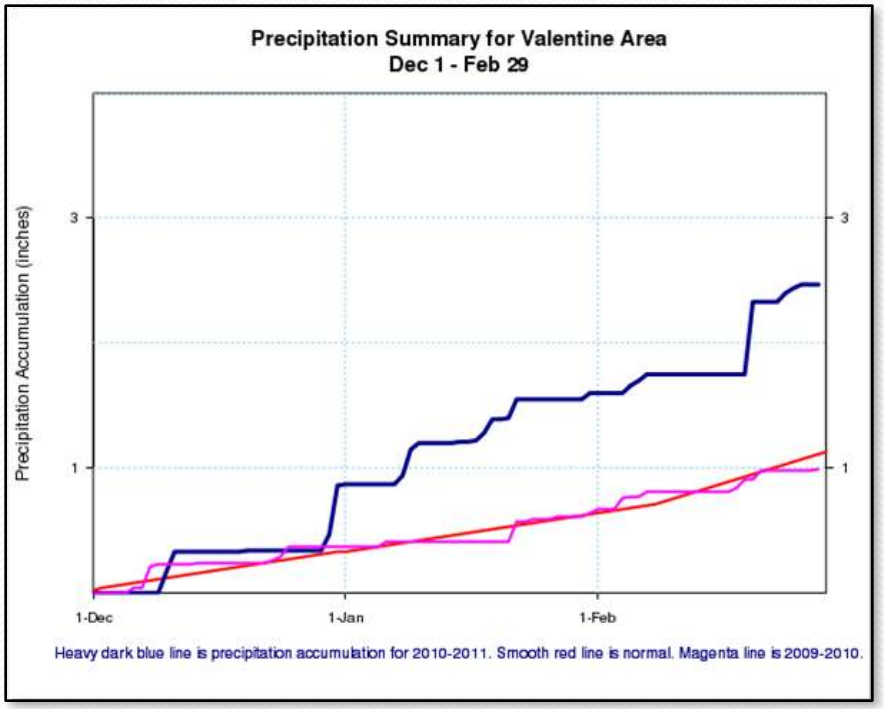
Facts for the 3 month period of December, January and February (including the last 5 years)

	Ave High	Ave Low	Ave Temp	Precip	Snowfall	Days Lows < 0	Days Highs > 32	Days Highs 50+	Days Highs 60+
Average	35.6	11.2	23.4	1.36	16.5	18.3	55.1	17.4	4.4
Max	44.6	20.7	31.3	3.58	42.6	48	78	36	12
Year	1991-92	1930-31	1930-31	1943-44	1928-29	1978-79	1991-92	1980-81	1961-63 1994-95 1998-99
Min	22.3	-2.6	9.8	0.15	4.2	2	24	0	0
Year	1978-79	1978-79	1978-79	1956-57	1950-51	1930-31	1978-79	1978-79	12 times latest 2009-10
2006-07	34.6	11.0	22.8	2.26	19.7	17	54	11	2
2007-08	35.3	9.7	22.5	1.63	16.4	16	52	11	1
2008-09	36.2	11.8	23.9	1.55	16.4	18	61	19	6
2009-10	30.6	10.1	20.4	0.99	13.1	18	42	4	0
2010-11	32.9	8.4	20.7	2.47	23.0	23	48	14	2

Temperature and Precipitation Records (1889-1890 to current - missing 1892-1893)
Snowfall Records (1900-1901 to current)
Leap years have 91 days / Non-leap years have 90 days

2010-2011 Winter
Valentine, NE





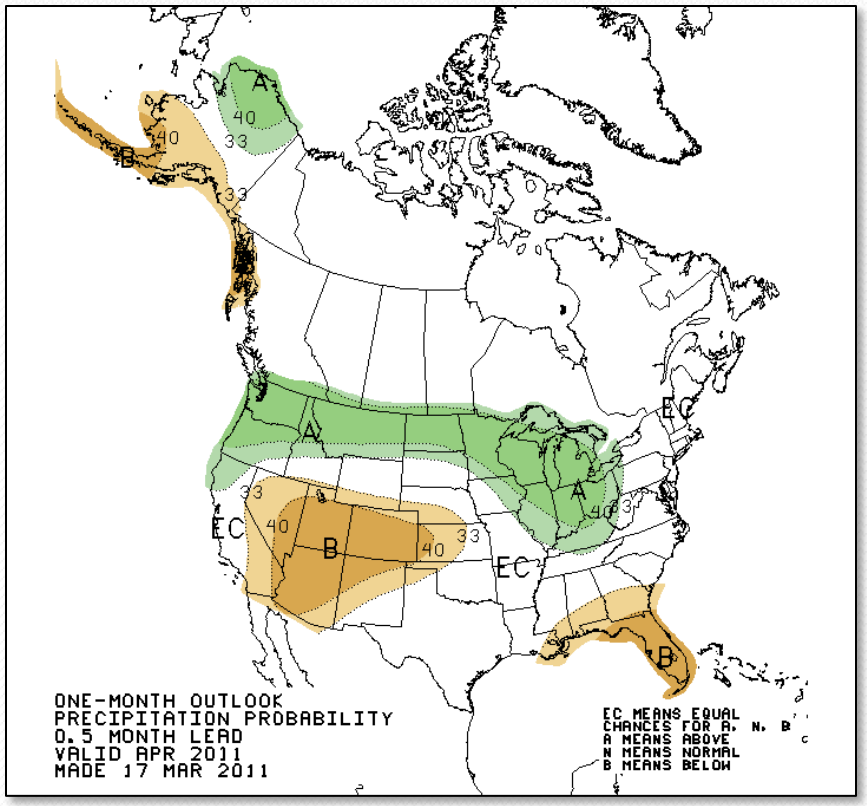
Temperature Summary for Valentine
Dec 1, 2010 to Feb 28, 2011
Smooth tan line is normal
Red and blue lines are records

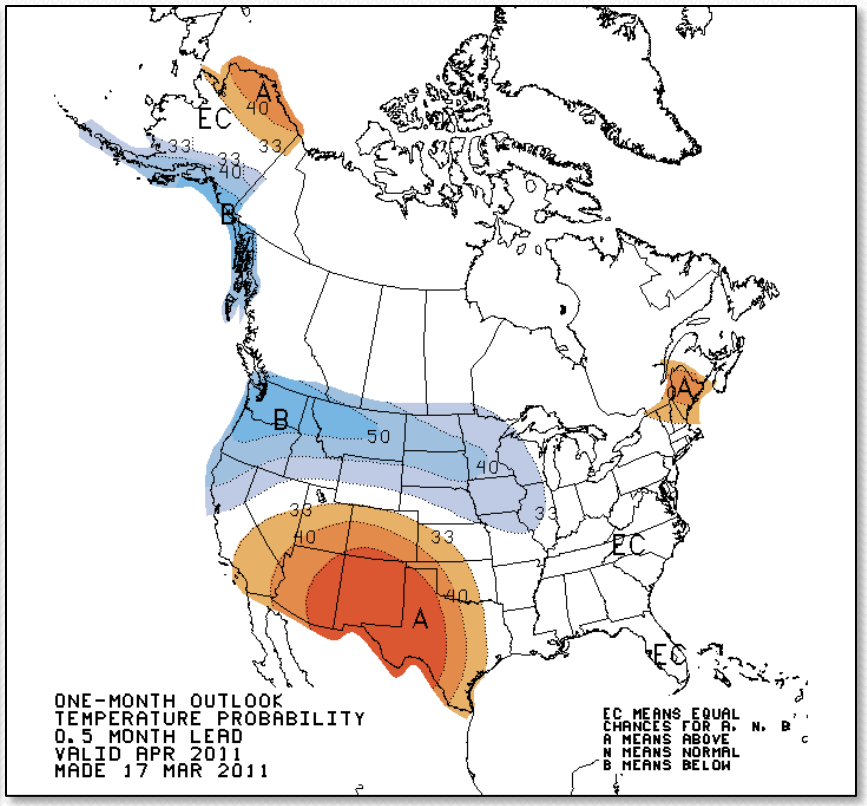
Precipitation Summary for Valentine
Dec 1, 2010 to Feb 28, 2011 (dark blue)
Dec 1 2009 to Feb 28, 2010 (magenta)
Smooth red line is normal

Spring Outlook

- Still have a La Niña pattern (although it is weakening)
- Lingering effects from wintertime pattern
  - Polar Jet Stream – promotes more clipper systems or fast moving cold fronts
  - Fast moving fronts have limited time to produce significant moisture over the high plains
  - Drier overall atmospheric conditions favor a wide swing of temperatures from day to day

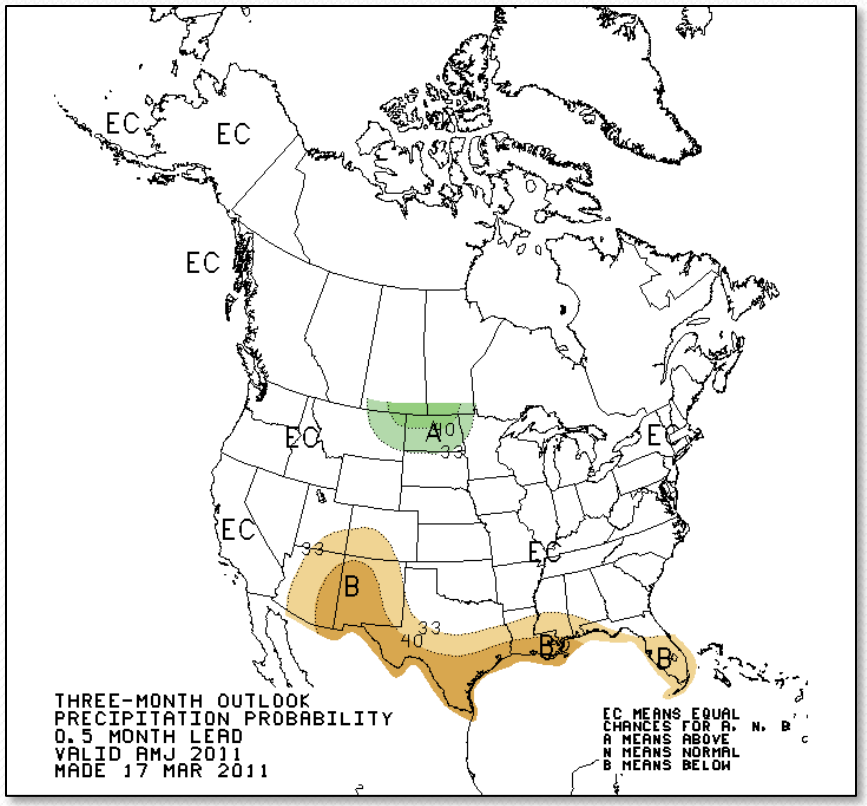
Climate Prediction Center Forecast - April

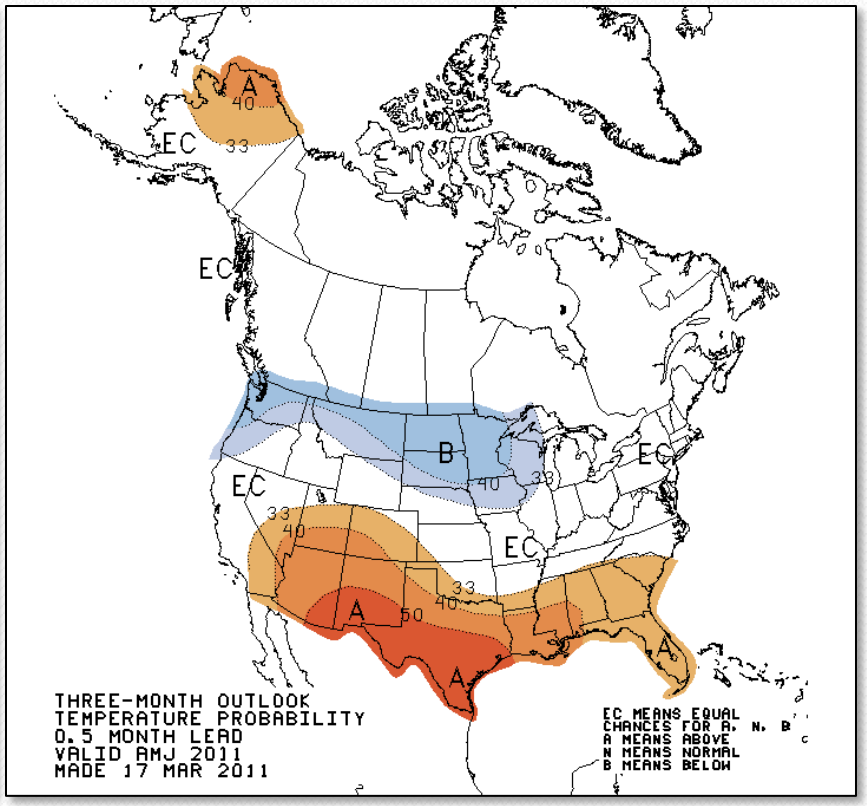




Higher confidence in southwest Nebraska to experience below normal precipitation while equal chance for above, below or near normal precipitation for northwest and north central Nebraska. Higher confidence the below normal temperatures to continue over northwest and north central Nebraska. Notice the higher confidence in above normal temperatures in Colorado and western Kansas.

Climate Prediction Center Forecast - April, May, June

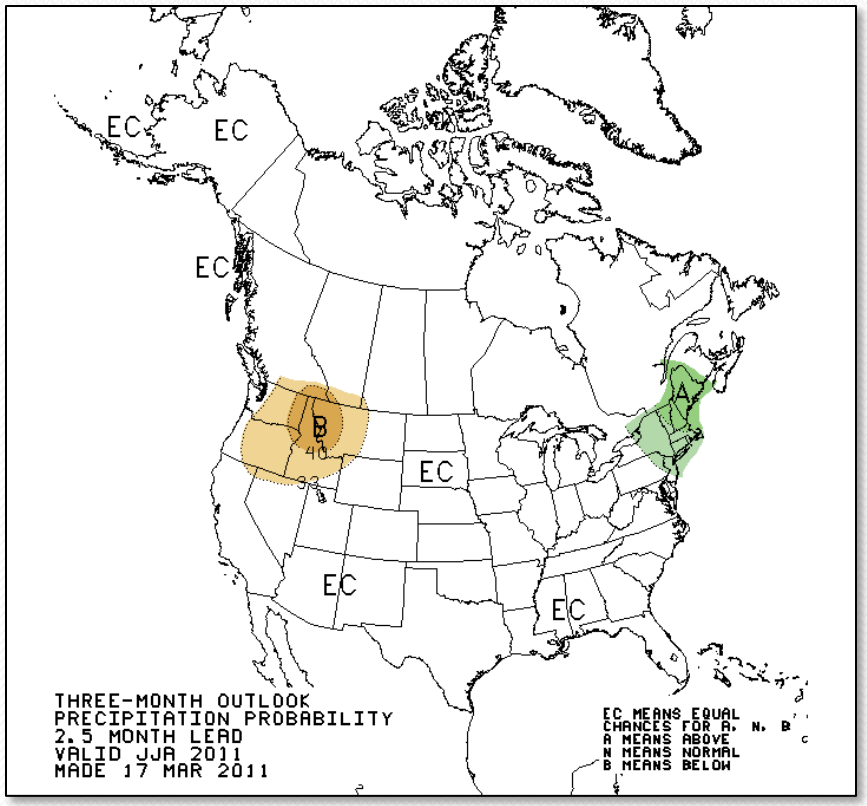


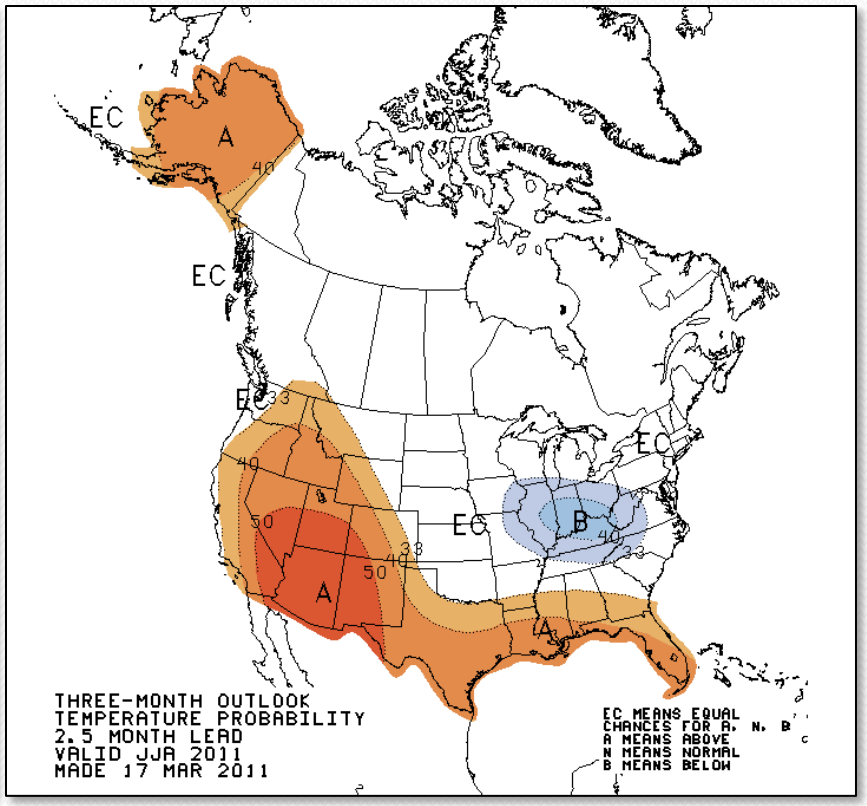


With the weakening of La Niña, the forecast for April, May and June are for equal chances for above, below or near normal precipitation. Some lingering effects of the cooler temperatures to produce a slightly higher confidence in northern Nebraska to see below normal temperatures. However the area of equal chances for below, above or near normal temperatures has expanded.

Climate Prediction Center

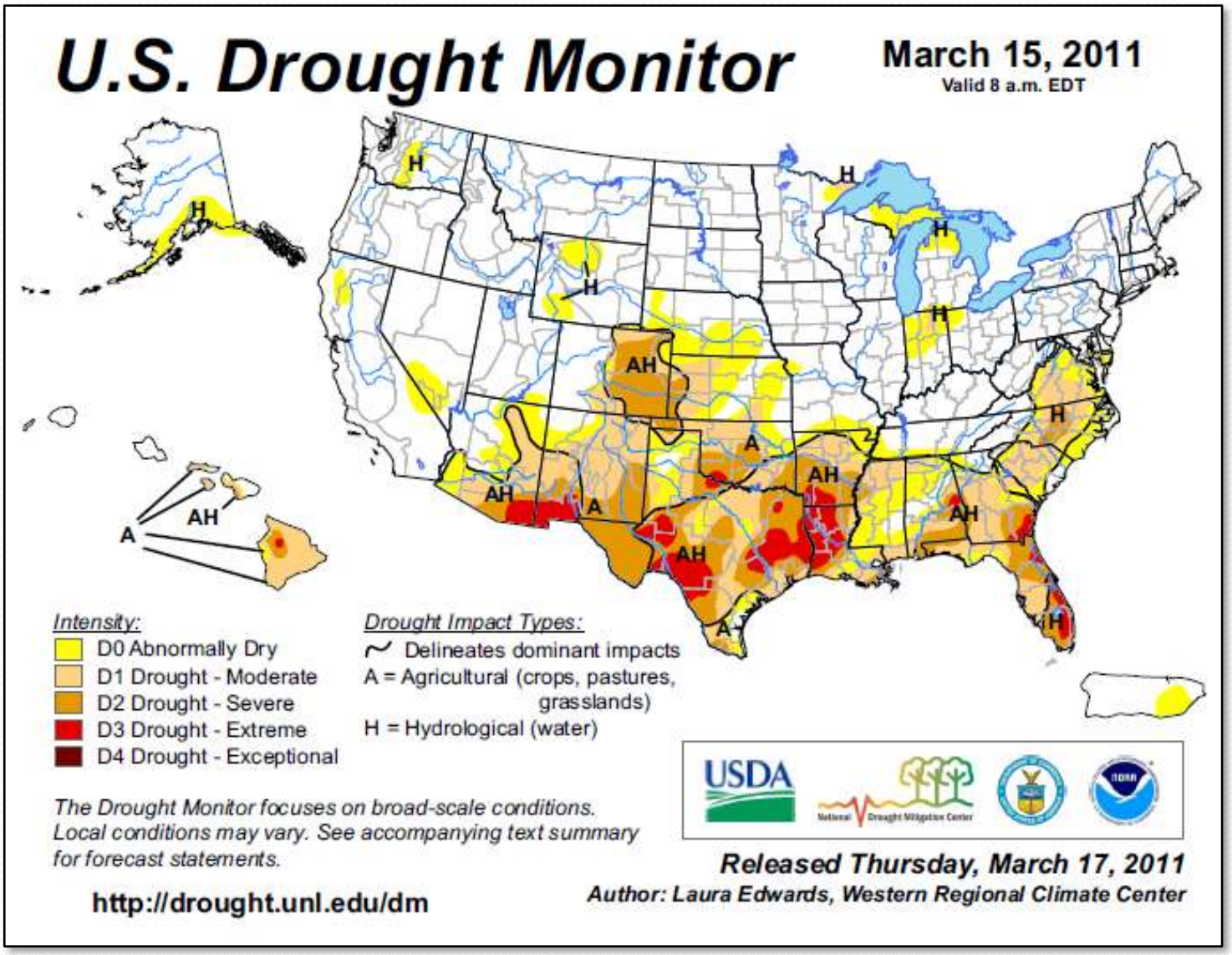
Summer Forecast – June, July, August





The ENSO (El Niño Southern Oscillation) phase is expected to trend toward neutral this summer. This pushes the long range forecast to have more uncertainty for the summer. Thus western and north central Nebraska see a forecast of equal chances for above, below or near normal precipitation and temperatures.

Current Drought State



Current Drought State

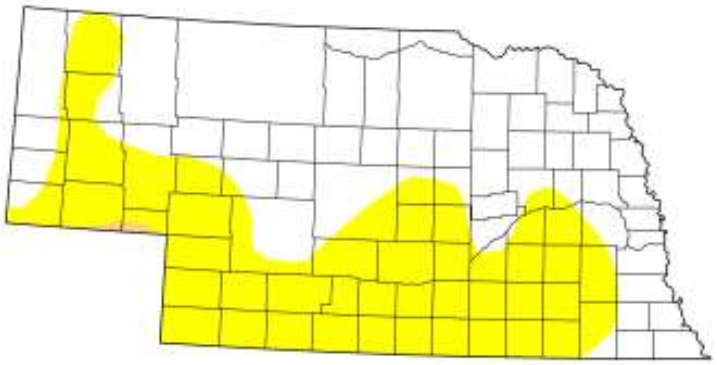
U.S. Drought Monitor

March 15, 2011
Valid 7 a.m. EST

Nebraska

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	56.85	43.15	0.32	0.00	0.00	0.00
Last Week (03/08/2011 map)	52.48	47.52	0.33	0.00	0.00	0.00
3 Months Ago (12/14/2010 map)	63.40	36.60	9.96	0.00	0.00	0.00
Start of Calendar Year (12/28/2010 map)	54.09	45.91	9.96	0.00	0.00	0.00
Start of Water Year (09/28/2010 map)	80.59	19.41	0.00	0.00	0.00	0.00
One Year Ago (03/09/2010 map)	100.00	0.00	0.00	0.00	0.00	0.00



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

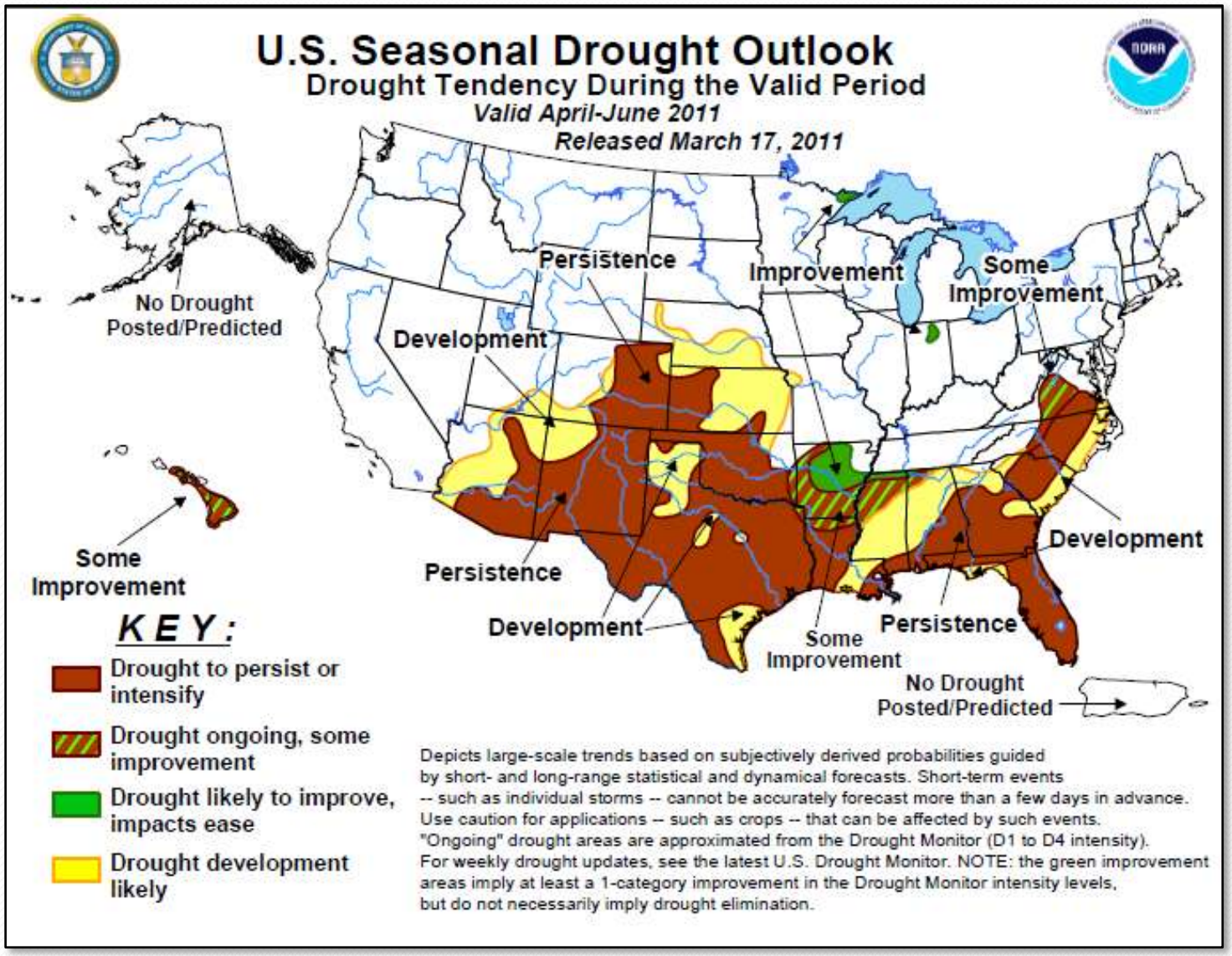
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

USDA National Drought Mitigation Center

Released Thursday, March 17, 2011
Laura Edwards, Western Regional Climate Center

Drought Developing??

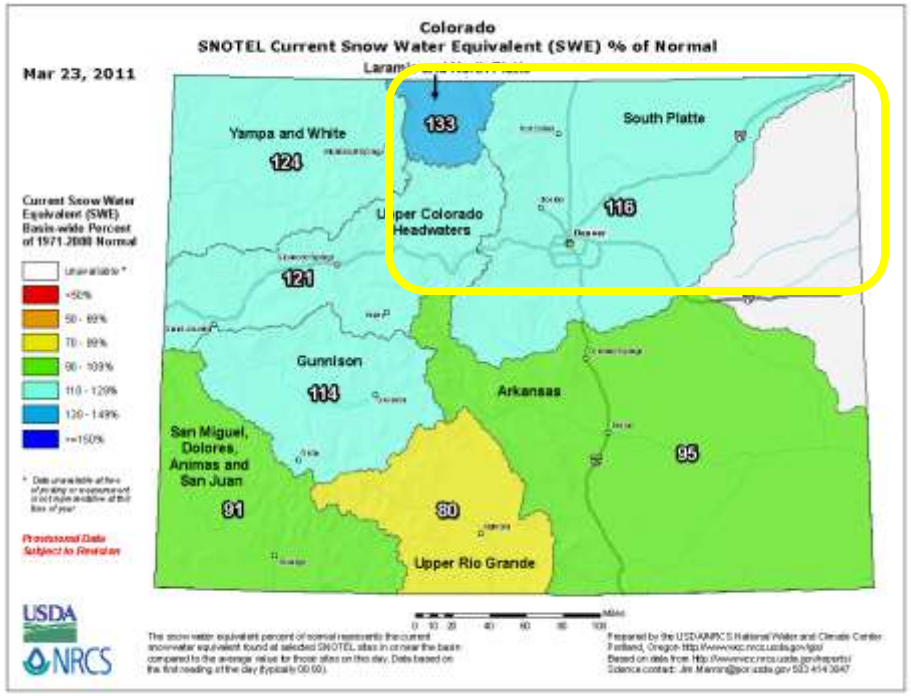


Drought Developing??

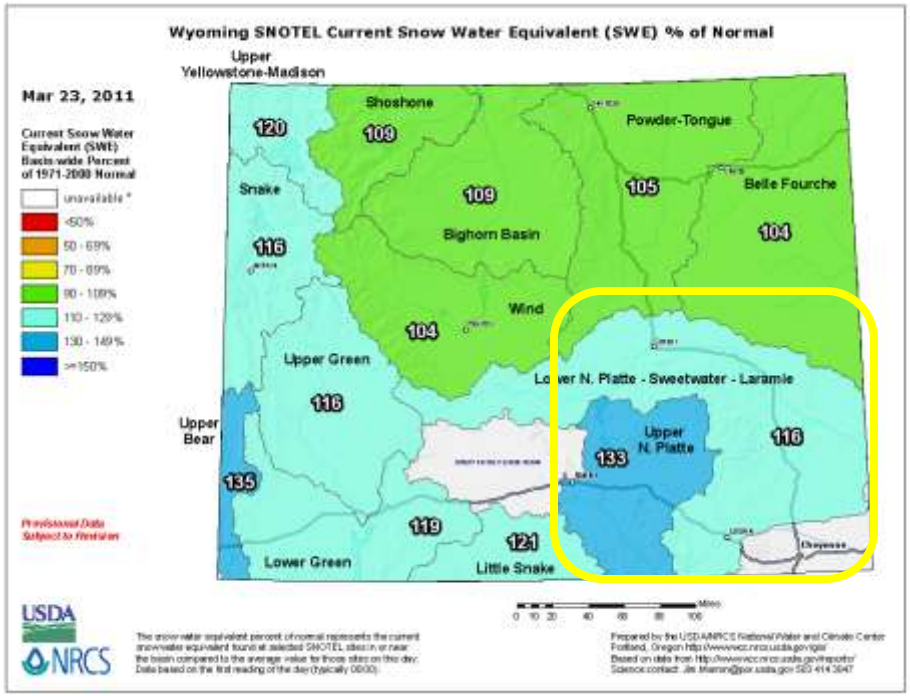
- Southwest Nebraska is being monitored for developing drought conditions.
- Below normal precipitation is expected over the next month or so. April is when this area begins to receive more significant rainfall from thunderstorms.

Dry but River Flooding??

- The past several months have resulted in above normal snowfall and snow pack in the mountains in northeast Colorado and southwest Wyoming



Colorado Snow Water Equivalent – 116 to 133% of normal



Wyoming Snow Water Equivalent – 116 to 133% of normal

Dry but River Flooding??

- After above average precipitation the past couple of years and in anticipation of the above normal snow melt, Wyoming reservoirs and Lake McConaughy are already releasing water causing the North Platte river to run at a higher than normal flow and even above flood stage near Lewellen and North Platte
- Once this snow begins to melt this spring, the Platte River system is expected to run elevated and possibly near or above flood stage for an extended time period

Final Thoughts for the Spring

- Weakening La Niña to create tricky forecast for Nebraska
- Higher confidence areas to the north and east – cool and wet
- Higher confidence areas to the south and west – warm and dry
- Drought conditions may expand into southwest Nebraska
- Meanwhile above normal snowfall in the central Rocky Mountains will contribute to possible river flooding along the Platte River

Questions – Matthew.Masek@noaa.gov